

What is claimed is:

Sub A2
1. An article comprising diamond deposited on a framework material substrate having a porosity sufficient to permit the flow of fluids in at least one direction through the material.

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2. The article of claim 1 wherein said framework material substrate comprises a material compatible with a diamond deposition process.

10 3. The article of claim 1 wherein said framework material substrate comprises a material incompatible with a diamond deposition process coated with a material compatible with a diamond deposition process.

15 4. The article of claim 1 wherein said diamond has a thickness of at least about 2 microns.

5. The article of claim 1 wherein said diamond is fully coalesced.

Sub A3
20 6. An article comprising diamond deposited on a open-cell foam substrate having a porosity sufficient to permit the flow of fluids in at least one direction through the material.

7. The article of claim 6 wherein said framework material substrate comprises a material compatible with a diamond deposition process.

8. The article of claim 6 wherein said framework material substrate
5 comprises a material incompatible with a diamond deposition process coated with a material compatible with a diamond deposition process.

9. The article of claim 6 wherein said diamond has a thickness of at least about 2 microns.

10. The article of claim 6 wherein said diamond is fully coalesced.

11. The article of claim 6 wherein said article has a porosity of at least 100 voids/inch.

12. A method for forming a porous diamond article comprising:
providing a porous substrate;
preparing said porous substrate for diamond deposition; and
depositing diamond material on said porous substrate.

13. The method of claim 12 wherein depositing diamond material on said porous substrate comprises depositing diamond to a thickness of at least about 2 microns.

5 14. The method of claim 12 wherein depositing diamond material on said porous substrate comprises depositing diamond until said diamond is fully coalesced.

10 15. The method of claim 12 wherein depositing diamond material on said porous substrate comprises depositing diamond to a thickness such that the porosity of said article is at least 100 voids/inch.

15 16. The method of claim 12 wherein depositing diamond material on said porous substrate comprises depositing diamond material by microwave assisted plasma deposition.

17. The method of claim 12 wherein depositing diamond material on said porous substrate comprises depositing diamond material by arc plasma torch deposition.

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18. The method of claim 12 wherein depositing diamond material on said porous substrate comprises depositing diamond material by hot filament diamond deposition.

5 19. The method of claim 12 wherein depositing diamond material on said porous substrate comprises depositing diamond material by RF assisted plasma deposition.

10 20. A method for forming a diamond foam article comprising:
providing a foam substrate;
preparing said foam substrate for diamond deposition; and
depositing diamond material on said foam substrate.

15 21. The method of claim 20 wherein depositing diamond material on said porous substrate comprises depositing diamond to a thickness of at least about 2 microns.

20 22. The method of claim 20 wherein depositing diamond material on said porous substrate comprises depositing diamond until said diamond is fully coalesced.

23. The method of claim 20 wherein depositing diamond material on said porous substrate comprises depositing diamond to a thickness such that the porosity of said article is at least 100 voids/inch.

5 24. The method of claim 20 wherein depositing diamond material on said porous substrate comprises depositing diamond material by microwave assisted plasma deposition.

10 25. The method of claim 20 wherein depositing diamond material on said porous substrate comprises depositing diamond material by arc plasma torch deposition.

15 26. The method of claim 20 wherein depositing diamond material on said porous substrate comprises depositing diamond material by hot filament diamond deposition.

27. The method of claim 20 wherein depositing diamond material on said porous substrate comprises depositing diamond material by RF assisted plasma deposition.

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